What is claimed is:

[Claim 1] 1. A freestanding micrometer for determining the diameter of a cylindrical body, the freestanding micrometer comprising:

a housing;

means for supporting the housing on a surface of the cylindrical body while the cylindrical body is oriented so that its longitudinal axis is approximately horizontal;

first measurement means movably supported by the housing so that the position of the first measurement means can be altered in a lateral direction approximately perpendicular to the longitudinal axis of the cylindrical body, the first measurement means being adapted for sensing a first surface point of the cylindrical body laterally spaced apart from the housing and disposed in a cross-sectional plane of the cylindrical body, the first surface point defining a terminal of a chord lying in the cross-section plane of the cylindrical body;

second measurement means mounted to the housing for contact with a second surface point of the cylindrical body disposed in the cross-sectional plane of the cylindrical body, the second surface point defining a location along the length of the chord; and

means for determining the diameter of the cylindrical body based on the length and height of the chord ascertained from first and second outputs of the first and second measurement means, respectively.

[Claim 2] 2. The freestanding micrometer according to claim 1, wherein the housing is positioned on the cylindrical body while the cylindrical body is oriented so that the longitudinal axis of the cylindrical body is approximately horizontal, the second measurement means is positioned approximately top-dead-center on the cylindrical body and the chord is horizontal so that the second surface point locates the midpoint of the length of the

chord, the length of the chord being ascertained by the position in the lateral direction of the first measurement means relative to the second measurement means.

[Claim 3] 3. The freestanding micrometer according to claim 1, wherein the determining means is programmed to calculate the diameter of the cylindrical body based on the formula

$d = (c^2 + 4h^2)/4h$

where d is the diameter of the cylindrical body, c is the length of the chord, and h is the height of the chord.

[Claim 4] 4. The freestanding micrometer according to claim 1, wherein the determining means comprises:

a computer outside the housing for calculating the diameter of the cylindrical body; and

means for transmitting the first and second outputs to the computer.

[Claim 5] 5. The freestanding micrometer according to claim 1, wherein the support means enables the freestanding micrometer to travel along a longitudinal length of the cylindrical body.

[Claim 6] 6. The freestanding micrometer according to claim 5, wherein the support means comprises wheels supported by bearings, the wheels having axes of rotation oriented in a vertical direction when supporting the housing, the bearings having diameters larger than the diameters of the wheels.

[Claim 7] 7. The freestanding micrometer according to claim 6, further comprising means for sensing a distance the freestanding

micrometer travels along the longitudinal length of the cylindrical body.

[Claim 8] 8. The freestanding micrometer according to claim 7, further comprising means for determining a profile of the cylindrical body along the longitudinal length thereof based on changes in the diameter of the cylindrical body determined at different locations along the longitudinal length of the cylindrical body.

[Claim 9] 9. An electronic profile acquisition micrometer system for sensing the diameter and variations in the diameter of a cylindrical body while the cylindrical body is oriented so that its longitudinal axis is approximately horizontal, the micrometer system comprising:

a portable freestanding micrometer unit comprising:

a housing;

wheels mounted to the housing and adapted for supporting the housing on an upper surface of the cylindrical body while the cylindrical body is oriented so that the longitudinal axis thereof is approximately horizontal and the housing travels on the upper surface of the cylindrical body along a longitudinal length thereof;

an arm mounted to the housing and projecting outwardly therefrom in a lateral direction approximately perpendicular to the longitudinal axis of the cylindrical body, the arm having graduations along a length thereof;

first electronic linear measurement means for producing a first output signal, the first electronic linear measurement means being movably mounted to the arm so that the first electronic linear measurement means can be selectively positioned along the length of the arm with the graduations, the first electronic linear measurement means being adapted for contacting a first surface point of the cylindrical body when the first electronic linear measurement means is vertically displaced, the first surface point being laterally spaced apart from the housing and disposed in a cross-sectional

plane of the cylindrical body, the first surface point defining a terminal of a horizontal chord lying in the cross-section plane of the cylindrical body; and

second electronic linear measurement means for producing a second output signal, the second electronic linear measurement means being mounted to the housing for contacting a second surface point of the cylindrical body beneath the housing when the second electronic linear measurement means is vertically displaced, the second surface point being disposed in the cross-sectional plane of the cylindrical body and locating the midpoint of the length of the horizontal chord;

data acquisition means for receiving the first and second output signals from the first and second electronic linear measurement means and storing the output signals as data;

a computer separate from and outside the housing for receiving the data stored by the data acquisition means and calculating the diameter of the cylindrical body based on the length and height of the horizontal chord ascertained from the first and second output signals of the first and second electronic linear measurement means, the length of the horizontal chord being ascertained by the relative positions in the lateral direction of the first and second surface points sensed by the first and second electronic linear measurement means, the height of the horizontal chord being ascertained by the relative vertical positions of the first and second surface points sensed by the first and second electronic linear measurement means; and

means for connecting the computer to the data acquisition means for transmitting the data.

[Claim 10] 10. The electronic profile acquisition micrometer system according to claim 9, wherein the computer is programmed to calculate the diameter of the cylindrical body based on the formula

$$d = (c^2 + 4h^2)/4h$$

where d is the diameter of the cylindrical body, c is the length of the horizontal chord, and h is the height of the horizontal chord.

[Claim 11] 11. The electronic profile acquisition micrometer system according to claim 9, wherein the wheels are supported by bearings and have axes of rotation oriented in a vertical direction when supporting the housing.

[Claim 12] 12. The electronic profile acquisition micrometer system according to claim 9, further comprising means for sensing a distance the housing travels along the longitudinal length of the cylindrical body.

[Claim 13] 13. The electronic profile acquisition micrometer system according to claim 12, further comprising means for determining a profile of the cylindrical body along the longitudinal length thereof based on changes in the diameter of the cylindrical body continuously determined along the longitudinal length of the cylindrical body.

[Claim 14] 14. The electronic profile acquisition micrometer system according to claim 9, further comprising means for sensing a temperature of the cylindrical body adjacent at least one of the first and second surface points.

[Claim 15] 15. A method of determining the diameter of a cylindrical body, the method comprising the steps of:

supporting a housing on a surface of the cylindrical body while the cylindrical body is oriented so that its longitudinal axis is approximately horizontal;

positioning a first measurement means relative to the housing in a lateral direction approximately perpendicular to the longitudinal axis of the cylindrical body;

producing a first output signal with the first measurement means by sensing a first surface point of the cylindrical body laterally spaced apart from the housing and disposed in a cross-sectional plane of the cylindrical body, the first surface point defining a terminal of a chord lying in the cross-section plane of the cylindrical body;

producing a second output signal with a second measurement means by sensing a second surface point of the cylindrical body adjacent the housing and disposed in the cross-sectional plane of the cylindrical body, the second surface point defining a location along the length of the chord; and

determining the diameter of the cylindrical body based on the length and height of the chord ascertained from the first and second output signals.

[Claim 16] 16. The method according to claim 15, wherein the housing is supported on an upper surface of the cylindrical body, the second measurement means is positioned approximately top-dead-center on the cylindrical body and the chord is horizontal so that the second surface point locates the midpoint of the length of the chord, the length of the chord is ascertained by the relative positions in the lateral direction of the first and second surface points sensed by the first and second measurement means, the height of the chord being ascertained by the relative vertical positions of the first and second surface points sensed by the first and second measurement means.

[Claim 17] 17. The method according to claim 15, wherein the diameter is determined with a computer program that calculates the diameter of the cylindrical body based on the formula

$$d = (c^2 + 4h^2)/4h$$

where d is the diameter of the cylindrical body, c is the length of the chord, and h is the height of the chord.

[Claim 18] 18. The method according to claim 15, wherein the first and second output signals are transmitted from the housing to a computer outside the housing, and the computer calculates the diameter of the cylindrical body.

[Claim 19] 19. The method according to claim 15, further comprising the steps of:

causing the housing to travel along a longitudinal length of the cylindrical body;

sensing a distance the housing travels along the longitudinal length of the cylindrical body; and

determining a profile of the cylindrical body along the longitudinal length thereof based on changes in the diameter of the cylindrical body determined at different locations along the longitudinal length.

[Claim 20] 20. The method according to claim 15, further comprising the step of sensing a temperature of the cylindrical body.